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TRIATOMA HEIDEMANNI AS A POSSIBLE VECTOR OF RELAPSING FEVER*

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I. Introduction

Dutton and Todd[1] proved experimentally in 1905 that *O. moubata* transmitted *S. duttoni*, and proved conclusively that it was a true intermediate host. Since that time other members of the Ornithodoros have been incriminated as vectors of relapsing fever. Six species of Ornithodoros have been recognized in the United States. One or more species have been reported from each of seventeen states. Davis (1940) enumerates eleven states in which tick-borne relapsing fever is present. The known vectors are *O. turicata* in Texas and Kansas, and *O. hermsi* in California, Colorado and Idaho. *O. parkeri* is the only known species in a large area from which seventeen cases have been reported.

* *Presented at the Annual Convention of the American Society of Medical Technologists, Philadelphia, June 10, 1942. (Honorable Mention).*

[1] Liverpool School of Trop. Med., Memoir XVII; Lancet, Nov. 30, 1907, p. 1523.

[2] C. R. Sci., Cliv., p. 1636; Clv. p. 481.

Nicolli, Blaizot and Conseil[2] showed by experiments that infection by means of *Pediculus vestimenti* and *P. capitis* was untenable. However, when infected lice were crushed by scratching or rubbing at the site of the bite infection resulted. This was probably due to inoculation of the parasites from the bugs into the abraded skin. The bite of the louse alone is quite harmless. Gillespie (1935) states that there is some variation in symptamology in the louse-borne (European) relapsing fever variety and the tick-borne (New World) variety. Nicolli and Anderson (1926) believed they demonstrated that *O. moubata* and the louse could transmit human recurrent fever to monkeys. Hegner, Root and Augustine (1929) state that, "In laboratory experiments bed bugs have been shown to be capable of transmitting relapsing fever. . . ."

As early as 1931 Graham reported on cases of relapsing fever in Texas and advanced the belief that animal reservoirs existed. Kritchewski and Coleman (1934) made a study of several species of ticks and reservoir hosts of relapsing fever. They stated that rodents are the commonest reservoir. Donkeys, horses, sheep, goats, foxes, and other wild animals have crytic infections. Since then, o'possums, bats, and armadillos have been found to be naturally infected. Results of experimental transmission of relapsing fever in young birds by Bohls and Irons (in press) would indicate the existence of another possible reservoir host.

Attention has been called to the presence of a blood sucking insect, Triatoma, found in relapsing fever areas in Texas by Packchanian 1939; 1941. These Triatoma were shown to be naturally infested with *T. cruzi* in a large percent of the number examined. Numerous reservoir hosts upon which they feed have been listed. Clark and Dunn (1932); Dias (1937); Wood and Wood (1941) and Kofoid and Donant (1933) have reported bats, o'possums, wood rats, armadillos, house mice, and squirrels naturally infected with *T. cruzi*.

The similarity of these reservoir hosts with those of relapsing fever has suggested the possibility that the Triatoma may also be incriminated as a possible vector for relapsing fever.

Kemp, Moursund and Wright (1934) failed to demonstrate the

presence of infected ticks in caves where human infections of relapsing fever apparently originated. Of twenty-five cases investigated by Bohls and Schuhardt (1933) in Texas, only ten reported the presence of tick bites. Morrison and Parsons (1941) reported three cases in a family, one being a six day old child. No rodents or Ornithodoros were found in the house. These, and other similar cases are interesting from an epidemlogical standpoint in that no known vector could be incriminated. With this in view, and the fact that the Ornithodoros and the Triatoma feed upon the same naturally infected reservoir hosts, the following study was conducted.

II. Materials and Methods

In our efforts to show whether or not the Triatoma may be a natural vector for relapsing fever, several problems must first be examined. The first question to arise is the survival time of the ingested spirochetes in the Triatoma. A certain time must elapse before the vector becomes infectious and if the spirochetes can survive only a short time it is doubtful if the insect can become infected and transmit the disease. If the spirochetes survive a sufficient length of time it then becomes necessary to determine if the Triatoma is capable of transmitting the disease, and if so, the route of transmission.

Rats showing an initial infection of relapsing fever were obtained from the University of Texas. The Triatoma used were obtained from Rogers, Texas. Only nymphs were used in the experiments due to erratic feeding habits of the adults. These were identified as *Triatoma heidemanni* by Barber.[3] Insectery-reared Triatoma were not used due to the long period required for their development. Triatoma in the fifth instar were used since this stage is the one most commonly used in Xenodiagnosis of Chagas' disease. Controls were run by injecting two rats with the pooled macerated viscera of fifteen nymphs. These rats remained free from infection for fifteen days.

Lot #3.4 Triatoma were fed on rat #1. Three days later a nymph

[3] The U. S. P. H., Bethesda, Washington.

from this lot was macerated, suspended in sterile saline and injected into a normal white rat, #3.2. A thick smear of the inoculum stained with Giemsa showed several intact spirochetes. Three days later the rat became positive, showing that the spirochetes remain viable in the bug for three days.

Five days after the infectious feeding of Lot #3.4 another nymph was macerated, suspended in sterile saline and injected subcutaneously into a normal rat, #4.1a. A smear of the inoculum showed intact spirochetes.

Six days after injection a few spirochetes were found in the Giemsa-stained thick smear of the rat's blood. The following day the spirochetes were numerous, showing that the spirochetes remained viable in the bug for five days.

Eleven days after having fed on the infected rat a third nymph from Lot #3.4 was crushed, suspended in saline and injected into a normal rat, #6.2. Within nine days this rat became positive. Thus, it was established that the spirochetes remained viable in the bug for at least eleven days.

The next step was to determine if the Triatoma might possibly be a vector for relapsing fever. Two routes of investigation were open. It is generally known that relapsing fever is transmitted through the dejecta of infected Ornithoros rather than through the bite of the bug. This line of investigation was followed in the following manner. Lot #3.4 Triatoma, which had fed on a parasitized rat and had been shown to retain the spirochetes in viable form in presumably all of the bugs for as long as eleven days was used.

Ten days after the infectious blood-meal feces was expressed from the six remaining bugs and pooled. Some of this material was rubbed into the shaved, abraded skin of normal rat #5.2 and the remainder suspended in saline and injected into another normal rat. These animals remained negative throughout a fourteen day period. No smear was made of the inoculum since we would not expect to find spirochetes in it.

The remaining Triatoma in lot #3.4 were fed on a normal rat, #5.3 eleven days after the infectious blood-meal. This rat remained negative for fifteen days and was then discarded.

Since there was a possibility that insufficient time has elapsed following the infectious feeding to allow the lot to become positive, they were again fed on a normal rat, #6.2. This was one month after the infectious blood-meal. The rat remained clear of infection for fifteen days.

The remainder of the lot were macerated in sterile saline and injected into a normal rat #6.3. This animal also remained negative for fifteen days. No spirochetes were found in a Giemsa-stained smear of the inoculum.

III.

During the above experiments the opportunity was provided for determining the viability of spirochetes in storage.

Blood from infected rat #3.3 was obtained aseptically by cardiac puncture and defibrinated by shaking in sterile glass beads for approximately ten minutes. Sterile tubes containing sterile gauze and sterile defibrinated rabbit's blood were used for storage. One-half cubic centimeter of the parasitized, defibrinated blood was added to each tube and they were then stored at 40°C.

Three days after storage, a tube of blood was inoculated intraperitoneally into rat #5.1. This rat became positive two days later.

One month after storage another tube of blood was inoculated into rat #15.4. A smear prepared from the inoculum and stained with Giemsa showed several intact spirochetes as well as bacterial contamination. The rat remained negative for twenty-one days and was then discarded. On two other instances (fifty and ninety-eight days later) bacterial contamination probably accounted for negative results.

Rat #20.1 was inoculated sixty-nine days after the blood had been stored at 4°C. A Giemsa-stained smear showed fairly numerous, intact spirochetes. This rat became positive six days after inoculation.

It was thus established that defibrinated, parasitized rat's blood retains viable relapsing fever spirochetes for at least sixty-nine days when stored at 4°C in defibrinated rabbit's blood with gauze. It is

apparent that the spirochetes do not tolerate bacterial contamination *in-vitro*. Coleman (1934) reports that spirochetes when similarly stored will remain viable for over five months. Jahnel (1938) found that spirochetes and trypanosomes will withstand cooling to—269.5°C in liquid Helium.

IV. Conclusions

A. 1. It was established that relapsing fever spirochetes remained viable in *Triatoma heidemanni* for three, five and eleven days, but not for a month. Stained smears of the inoculum showed progressively fewer spirochetes. This may account for the longer incubation period noted in each of the three positive animals.

2. The dejecta of these bugs did not infect a normal rat when rubbed into the abraded skin eleven and thirty days after an infectious feeding.

Relapsing fever was not transmitted by the bite of *Triatoma heidemanni* to normal rats up to one month after an infectious blood-meal.

B. 1. Relapsing fever spirochetes remained viable for at least sixty-nine days when parasitized rat's blood was defibrinated, mixed with sterile defibrinated rabbit's blood and gauze stored at 4°C.

2. Relapsing fever spirochetes did not tolerate bacterial contamination *in-vitro*.

V. Summary

Sporatic cases of relapsing fever in Texas with no history of a tick bite suggested the possibility of other vectors for the disease. It has been shown that both Ornithodoros and Triatoma (a certain type of reduvid bug) feeds upon the same infected reservoir hosts.

An attempt was made to incriminate *Triatoma heidemanni* as a vector for relapsing fever. The spirochetes were found to remain viable in the bug for at least eleven days, but not for thirty days.

Susceptible animals were exposed to the bite of the infested bug and to the feces, but in no instance did they show a spirochetosis.

It may be assumed that *Triatoma heidemanni* does not transmit relapsing fever.

BIBLIOGRAPHY

1. Bohls, S. W., and V. T. Schuhardt (1933). "Relapsing Fever in Texas and the Laboratory Method of Diagnosis." Texas State Journal of Medicine, 29: 119-203.
2. Clark, W. C., and L. H. Dunn (1932). "Experimental Studies on Chagas' Disease in Panama." American Journal of Tropical Medicine, 12: 49-77.
3. Coleman, G. E. (1934). "Relapsing Fever in California." I. Journal of Infectious Diseases, 54: 281.
4. ..... (1934). "Relapsing Fever in California. III. The Carrier Condition." Journal of Infectious Diseases, 54: 281.
5. Dias, Emmanuel (1937). "Trypanosomes In the Bat." Transactions of the Royal Society of Tropical Medicine and Hygiene, 31: 260.
6. Gillespie, James O. (1935). "Relapsing Fever in the United States." Journal of the American Medical Association, 104: 1878-1881.
7. Graham, G. M. (1931). "Relapsing Fever Endemic in Texas: Possibility of an Animal Reservoir." Texas State Journal of Medicine, 27: 226-228.
8. Hegner, Robert, Francis M. Root and Donald L. Augustine (1929). Animal Parasitology. New York: The Century Co.
9. Irons, J. V., and S. W. Bohls (1942). "Experimental Transmission of Relapsing Fever in Young Birds." (In Press).
10. Jahnel, F. (1938). "The Survival of Trypanosomes and Relapsing Fever Spirochetes After Cooling in Fluid Helium to —269.5°C." Ztschr, F. Immunitasf. U. Experim. Therap., 94: 328-341.
11. Kemp, Hardy, W. H. Moursund and H. E. Wright (1935). "Relapsing Fever in Texas." American Journal of Tropical Medicine, 15: 495-506.
12. Kofoid, C. A., and F. Donant (1935). "South American Trypanosomiasis of the Human Type—Occurrence in Mammals in the United States." California and West Medicine, 38: 245.
13. Morrison, Sidney K. and Lawrence Parsons (1941). "Relapsing Fever: Report on Three Cases, One A Six-Day Old Infant." Journal of American Medical Association, 116: 220-221.
14. Packchanian, A. (1939). "Natural Infection of Triatoma gerstakeri With Trypanosoma cruzi In Texas." U. S. Public Health Reports, 54: 1547-1554.
15. .....(1941). "Reservoir Hosts of Chagas' Disease in the State of Texas." Journal of Parasitology (Supplement), 27: 30.
16. Wood, F. D., and Sherwin F. Wood (1938). "On the Distribution of Trypanosoma cruzi Chagas' In the Southwestern United States." American Journal of Tropical Medicine, 18: 207-212.
17. .....(1941). "Present Knowledge of the Distribution of T. cruzi in Reservoir Animals and Vectors." American Journal of Tropical Medicine, 21: 335.

THE MAZZINI MICROSCOPIC FLOCCULATION TEST FOR THE SERODIAGNOSIS OF SYPHILIS*

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If we were to compare the results obtained by the participating tests at the Washington Serologic Conference of 1941 with those obtained by the leading tests at the League of Nations Serologic Conferences of 1923, 1928 and 1930, we could not fail to be impressed with the tremendous progress which has been made in serologic procedure in recent years. Yet, it is quite possible that further progress, both in sensitivity and specificity, can be attained in the future, although 100% sensitivity and 100% specificity are practically impossible.

No small measure of credit is due the U.S.P.H.S. for having undertaken the Evaluation of Serodiagnostic Tests for Syphilis in the United States in 1934-1935 and having instituted annual surveys of State Boards of Health Laboratories. These studies have stimulated considerable interest in serology and directly contributed to the perfection of serologic methods.

Serology is, for the greater part, empirical. Since we know so little about the actual mechanism of the reactions and still less regarding the nature of the active principle in beef heart muscle which causes such striking results when brought in contact with syphilitic serum, the development of a test is based largely on the trial and error method. Theoretical considerations alone are of little value, even though the principal factors which affect sensitivity and specificity are fairly well established. From experimental data (unpublished) the writer is of the opinion that there is more than one kind of lipoidal substance responsible for the activity of antigen extracts. A combination of certain lipoids (not necessarily from

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egg yolk) must be present in the extract if optimum sensitivity is to be obtained.

The test which is to be discussed presently is a relatively new method. Its development and evaluation, however, consumed three years, during which time more than 100,000 specimens were tested in parallel with other widely used technics. Included in these were several thousand blood specimens of diseased conditions other than syphilis that were obtained through the clinical facilities of Indiana University Hospitals as well as from other sources.

As is well known, the most successful tests for the serodiagnosis of syphilis, including the Wassermann test, are based on the interaction of normal tissue lipoids derived from beef heart with the reagin present in the serum of syphilitic individuals. The antigen in this test also contains beef heart lipoids and, in addition, makes use of lipoids obtained from egg yolk. The latter, while weakly antigenic by themselves, seem to become activated when combined with the beef heart lipoids and cholesterol.

Only a brief description of the procedure for the preparation, standardization and performance of the test will be presented here, and those who are interested in the details of the technic are referred to the latest article which appeared in the Journal of Venereal Disease Information, Volume 23, Number 4, April, 1942.

In the preparation of the antigen extract, a two to one ratio of beef and egg yolk powders are subjected to five brief ether extractions. The ethereal filtrates are saved for use later. After the ether extractions, the powder is dried and a quantity of absolute ethyl alcohol is added. The mixture is agitated mechanically or by hand for a definite period of time and then filtered.

The ethereal filtrates are now evaporated until all the ether has been removed, then a quantity of warm acetone is poured into the concentrated ether extracts. The mixture is stirred thoroughly, decanted into tubes and centrifuged. The acetone is poured off and discarded. Fresh warm acetone is added, the lipoids stirred with a rod, then the tubes are inverted a few times. The supernatant acetone is poured off and discarded. The lipoids are now collected and added to the alcoholic extract. The mixture is warmed in a water

bath and shaken frequently. The extract is cooled in the refrigerator for a short time. The antigen extract is then filtered and is ready for titration.

Since the reliability of any test depends on the quality of the antigen used and since it is well known that no matter how meticulously the antigen has been prepared it may, and often does, vary in sensitivity and specificity; consequently, the antigen employed in this test is a titrated antigen.

The titration consists in determining the quantity of cholesterinized alcohol to be added to the antigen extract. A constant level of sensitivity is thus obtained and comparable results in different laboratories may, therefore, be expected. A series of dilutions of the antigen extract with cholesterinized alcohol is set up and suspensions made from them. Each suspension is first tested for specificity, and those ratios found to give clear-cut negative reactions with normal serums are further tested with weakly positive serums from syphilitic individuals. A study of the results produced by the various suspensions is made and from this the titer of the antigen is selected.

The hydrogen ion concentration of the antigen suspension plays an important role in the sensitivity of the test; for just as maximum sensitivity is obtained at a certain concentration of lipoids, so maximum flocculation is obtained at a definite pH and salt concentration. This test, therefore, employs a buffered saline solution having a pH of 6.3 to 6.4 and a salt concentration of 10 grams per liter.

The patient's serum is prepared for testing by separating it from the clot by centrifugation and heating in the water bath. Care should be taken that no precipitate is present in the serum after the heating period and, if present, should be removed by re-centrifugation.

The test proper is very simple and is quickly done. The antigen suspension is prepared by adding a constant amount of titrated cholesterinized antigen to a constant quantity of buffered saline solution. The suspension is allowed to stand at room temperature for 3 hours, at which time the suspension reaches its optimum sensitivity. The suspension then continues to be usable for 24 hours. At the end of 3 hours, the bottle containing the suspension is agitated

gently, yet thoroughly, from the bottom to cork and back a few times; it is then transferred to a syringe fitted with a 25-gauge needle and is ready for instant use.

The test is performed upon wax or paraffine ringed glass slides. A small, but definite amount, of each patient's serum is pipetted in each chamber of the slide. One drop of the antigen suspension is discharged from the syringe to each serum. The slide is then rotated mechanically or by hand for a definite time at a definite number of rotations per minute. The results are examined immediately under the low power objective of the microscope and recorded as follows: No clumping, negative; very small, but definite, clumps, 1+ (coarseness or loose grouping of the antigen particles, the so-called plus-minus, should be disregarded since in many instances the grouping may be caused by the dragging of the particles on the surface of the slide as the result of evaporation of the serum or inaccurate pipetting or improper rotation of the antigen-serum mixture); small clumps, 2+; medium size clumps, 3+; and large clumps, 4+. An alternative method of reading may be used as follows: No clumping, negative; very small to small clumps, doubtful; medium to large clumps, positive.

Of great importance in the performance of serologic tests is the ability to detect zone reactions. It is well known that there are instances in which a serum containing a vast quantity of reagin produces a weakly, and at times almost completely negative, reaction. The inhibition of flocculation is due to an off balance in the antigen-reagin ratio, although the kind of chamber upon which the test is performed and perhaps other factors play a role in causing these reactions. There are two general types of zone reactions as they apply to this test: in one the cause is an insufficient amount of antigen, and in the second it is due to an excess of reagin. In most of the cases of Type I zones, the phenomenon is readily recognized by the appearance of irregular aggregates. These clumps, varying in size from small to large floccules, are scattered in fiields in which smaller clumps predominate. The correction of this deficiency is effected by adding a second drop of antigen suspension to the serum and re-rotating the slide for 4 minutes. If the addition of the second drop of antigen fails to increase materially the degree of floccula-

tion, then the reaction is probably a Type II zone. The second type of zone reaction is one seldom encountered, but more difficult to detect because of the almost complete inhibition of flocculation and, usually, there is also absence of irregular aggregation. Zone reactions of this type are corrected by preparing serial dilutions of the serum, such as 1:2, 1:4, 1:8, 1:16, etc., and proceeding as for routine testing. Since zone reactions are frequently misinterpreted and at times not even recognized, it is recommended that the addition of a second drop of antigen be made a routine practice whenever weakly positive reactions are obtained.

The adaptation of the test to the examination of spinal fluid was made with the view in mind to employ as small a quantity of the fluid as possible in order that other tests, such as the complement fixation, total protein and colloidal tests, may be performed on the amount of fluid available.

The rapid test for the spinal fluid examination which employs 0.1 cc. of fluid is, in most instances, sufficient when used as an adjunct to the complement fixation test. When the Wassermann test is not performed, then the concentration method should be carried out on the negative and weakly positive reacting fluids. For the rapid test, the fluid is centrifuged at high speed and the clear fluid transferred to a clean tube. A quantity of acetic acid is mixed with the spinal fluid in a chamber of a glass slide and one drop of the same antigen suspension, as is used for testing serum, is added. The mixture is rotated for a definite time at a definite number of rotations per minute. The results are examined in the same manner as for the test with serum. For the concentrated test, the fluid is evaporated to 1/15th to 1/20th the original volume, then tested in the same manner as that used in the acid test.

There has been much discussion concerning the desirability of standardization of reagents and technic. It would seem that this is not only desirable, but necessary, if we are to obtain uniform results. Obviously, reagents that are standardized should be expected to give comparable results in different laboratories under similar conditions. Fluctuations in sensitivity and specificity are not always due to human error. Allowances should be made,

however, for the individual factor; a 25 per cent error in interpreting results is, perhaps, within reasonable limits. Fluctuations beyond that limit should be charged against the quality of the antigen employed or to modifications of technic, either intentional or unintentional.

It must be admitted that there is much more uniformity of results in State Laboratories at the present time than was the case in the first survey of 1936; nevertheless, there is still room for improvement not only in State Laboratories but in private laboratories as well. If we were to take, for example, a laboratory where, with no change of technic or personnel, great variations in the efficiency of the same test were occurring from time to time, it would be logical to assume that the reagents, and the antigen in particular, were the responsible factors for the fluctuations. To determine the efficiency of serologic tests as performed by State Laboratories the U.S.P.H.S. conducts yearly surveys. While this is a step in the right direction, it would seem that a better index of efficiency could be attained if the test specimens were spread out at monthly intervals throughout the year. Since in large laboratories several batches of reagents are used in the course of a year, a good performance once a year would not necessarily mean either a satisfactory or a uniform performance during the interval. If agreement could be obtained (1) to adopt a central source of supply of reagents for the performance of standard tests, (2) to maintain a constant level of sensitivity and specificity as determined by each author-serologist, and (3) to adhere strictly to conventional technic, it is entirely possible to attain a comparable level and hold it indefinitely. Certainly this is a reasonable approach to bring about a relatively constant level of efficiency.

LABORATORY ECONOMY*

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Any one neglecting to consider laboratory economy is neither PROGRESSIVE nor PATRIOTIC. In this world crisis we have to justify the changing trends to eventually conclude that there is nothing to lose and everything to gain. This can be accomplished by releasing many of our habits and adjusting some of the routine techniques to meet the economy program. This program is compelling each and everyone of us to think for ourselves. Socrates taught that character is a matter of growth which is derived from the ability to think.

Laboratory economy is: *using a minimum of material for the maximum of results.*

Laboratory economy is concerned with equipment, supplies, chemicals, labor, time and material.

Equipment: When women first became indispensable in the business world an essay was written on Passivity and Progress (1). The author implied that women as a rule were slow to adapt new business equipment, the newer and time saving devices that were available to them. Modern devices that would not only save time but improve health, thereby allowing more time for study, recreation and happiness.

Women have come a long way since 1918. At least the pendulum swings toward progress. This is especially true of the laboratory worker whose varied techniques keep the mind alert. An active mind is ever ready and anxious to grasp new ideas, to explore new devices and equipment built for convenience and scientific studies.

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Any office or laboratory worker who is content to continue the old methods because adapting newer methods would upset the routine is certainly not Progressive. Laboratories are like good business houses, and they positively do not wish to have their organization stay behind, and be satisfied with the OLD WAY of doing things, when new methods are economical.

To enumerate the advantages of the new modern equipment for scientific studies would be to present a lengthy paper on that subject alone. It will suffice to state that this equipment is appreciated by all who use it, and the envy of those who do not have modern, time saving, accurate devices.

Supplies: To prevent waste it is necessary to order supplies from reliable well established firms who specialize in laboratory supplies and equipment in order to obtain the best results of purchasing power. Take advantage of discounts by purchasing in quantity lots. A slogan to remember when requisiting supplies: "Beware of small leaks for they will sink a great ship."

Chemicals: Many determinations do not require the better grades of chemicals. The technical grades may be substituted in many formulas. (2) A saturated solution of ammonium sulphate technical grade would be a saving of 50 per cent over the C. P. grade. Benzoic acid (synthetic) is also a 50 per cent savings. Guaiac is not as sensitive to occult blood as benzidine but as this latter is a derivative of Benzine it may soon be prohibited. The price is a vast difference. A gram of benzidine base is $4.50 while a pound of guaiac is $1.40. Hydrochloric acid for dissolving the red corpuscles in the diluting fluid in place of glacial acetic acid would save the price of at least two ten cent defense stamps. U.S.P. crystals of magnesium sulphate may be used in the solution for Robert's test. This test for albumin is inexpensive and dependable, and requires only one-third the material that is used for the sulphosalicylic acid test. This latter must be used if the tests are in the interest of an insurance company, regardless of cost. Determinations for sugar in the urine require a large amount of material. Benedict's quantitative would give the same results if the 25 cc. quantity is reduced to 5 cc. portions. Benedict's qualitative requires but 2½ cc. Sodium carbonate 10% (3) gives a satisfactory

quantitative estimation of sugar in the urine. It has the advantage of being compared to a set of standards or of being calculated from colorimeter readings. Galatest (4) is quoted in nominal figures if bought in quantity lots. One vial of Galatest is adequate for 250 tests for quantitative determinations of sugar in the urine. Most formulas require twice as much crystalline reagent as anhydrous in which case there would be no saving by the purchase of the crystalline product.

Time: Saving of time is something that must be worked out according to your absolute needs. This would cover time for technical services in the laboratory, and the most convenient and propitious time for both physician and technician to execute the necessary tests so as to be of the greatest benefit to the patient.

The medical and semi-professionals will have need of closer cooperation and united effort for they will have great uncertainties to face. This present world conflict will bring about complaints and symptoms that have never been observed in our generation or written in text books. It will be necessary for individual equilibrium to realize this pyschological problem.

In considering economy of the laboratory do not fail to consider the technician. Physical and mental health is very important not only to the technician but also to the community being served. When Pasteur stated, referring to the laboratories: ". . . There it is that humanity grows greater, stronger, better." Surely he included the laboratory technician in the word humanity. This is not understood by some directors. One clinical pathologist stated that he had not found out just how much work a technician *could do;* but, he did not add, how much a technician *could do* and maintain efficiency over a long period of time.

Stains: Loeffler's methylene blue is very economical for routine use as the cost is 5 cents for staining 100 slides. Gram's method of staining costs 80 cents for 100 slides. It would not be necessary to cover the entire slide with stain when one or two drops would stain a sufficient area for microscopic examination. A saving would be effected by tight fitting stoppers for bottles containing alcoholic stains.

Material: The material that is collected for laboratory diagnosis can cause delay in efficient reports, to say nothing of the chemicals wasted, unless complete information accompanies material which has been carefully collected for laboratory examination.

My own experience in collecting material from small children and infants necessitated a method that requires complete cooperation of nurses, medical staff and administrators. The medical director instructs attending and resident physicians to consult the Medical Technologist as to how material for examination should be collected for intelligent and speedy reports. The science instructor of the traniing school, who is also the head nurse, holds classes demonstrating HOW material should be sent to the laboratory and WHY. Cooperation is readily obtained when reasons are supplied that explain. For instance, the swab used in taking smears is not rubbed on the glass slide but, ROLLED with slight pressure to transfer the material from the swab to the slide without distorting the picture from that which existed on the living media. This swab is not rolled all over the slide but on either half of the slide. This permits routine stain with methylene blue on one-half of the slide and if differentiation of the organisms are necessary, the smear of the other end of the slide, which is the same material, is gram stained. Economy is observed in culturing for hemolytic organisms. The swab used to collect the material is inserted into a 5x⅝ tube containing about 3 cc. of sterile nutrient broth. This inoculated tube is incubated for 4 to 8 hours. The tube is then swished between the palms to remove the material from the swab. The swab is removed by pressure against the inside of the tube just above the line of liquid. Just before placing this swab in lysol solution and hence the incinerator, the swab is dobbed on the encircled area of a slide for preliminary examination. With this method 4 or 5 incubated broth cultures may be streaked on one blood plate. Do not forget, AGAR must be conserved.

Stools: Medias for proper culturing, are stored in small quantities, melted and poured when needed for inoculation with fresh material from the stool. For lipid partitions the technical petroleum ether of low boiling point (30-60C) is a great saving over the better grades and the results are parallel.

Blood slides: One-half the length of the slide is painted with 0.5% alcoholic brilliant creysl blue using a fine camel hair brush. A wax pencil line is drawn across the slide ¼ inch from the edge to denote the side painted and also to serve as a dam preventing the stain from running in contact with the fingers during washing procedure. The blood is spread by a slide held at 45° angle on the end furthest from the wax line, and brought up over the supravital stain to the pencil line. This permits report of reticulocytes and stippling without staining two slides. Blood is collected or allowed to drop into a vial 10 x 40 mm (5) which is scratched at 1 cc. and which contains the crystals of double oxalate in the ratio of 1 part to 500 parts of blood. After gentle mixing of blood with the oxalate crystals the dilution can be performed in the laboratory while the technician attends to the seventeen other determinations that are in the process of chemical changes. This method of diluting the blood in the laboratory has proven more efficient for hematological reports than direct dilution of capillary puncture.

When laboratory requests are not pressing, chemicals used in very small quantities are weighted and put in capsules, which are readily utilized when the work is urgent.

Placing slides in Xylol to remove the immersion oil before washing was found to be unnecessary and expensive. It is comparable to boil slides, immersion oil and all, in ½% lysol solution for 20 minutes. Keep covered with water, rinse in hot water and proceed with 20 minutes boiling in 0.5% Sulfax (6) solution and then in acid cleaning solution over night. Care in handling prevents scratches. The use of inexpensive noncorrosive laboratory slides have been found satisfactory. Bon Ami is surprisingly effective for slides reserved for microscopic examination of urinary sediment.

Glassware: Pipettes are washed by suction with 0.5% Sulfax followed by clear hot water and then distilled water. If they do not drain evenly, they are placed in the acid cleaning solution. To save the tip of pipettes place cotton or clean gauze at the bottom of the containers. Pipettes can be dried in the autoclave along with material to be sterilized. This saves the acetone, or alcohol-ether ordinarily used for drying blood diluting pipettes. Syringes are carefully scrubbed and thoroughly rinsed through two waters and dis-

tilled water before drying, wrapping and sterilizing. Accurate timing of sterilization (7) will prolong the life of the syringes and also the needles.

Because I have always practiced economy, not only from need but from habit, this sudden attempt of laboratory economy by some technicians reminds me of the conduct of the youngster who starts at Thanksgiving to be good for Xmas. If the behavior of this child has been a problem, the virtues on display at this time are very noticeable. The esthetic feeling of suddenly being economical is envied by the habitual economizer. It is to be hopeful that economy in the laboratory will have a permanent place in the program of the future, but, RIGHT NOW IT IS OUR PATRIOTIC DUTY TO AID DEFENSE BY LABORATORY ECONOMY.

BIBLIOGRAPHY

1. Brereton, Wm. Hill: Passivity and Progress of the Woman Who Works. Lineatime Mfg. Co., Rochester (Pub.)
2. Hepler, Opal. M.D.: Northwestern University Medical School, Chicago, Ill. (communication).
3. Somogyi, Michael, Ph.D., St. Louis, Mo.: A Rapid Method for the Estimation of Urine Sugar. J. of Lab. & Clin. Med., 26: 7, p. 1220, April, 1941.
4. Stanley, Phyllis, M.A., M.T.: The Detection of Sugar in Urine. A. J. Med. Tech., 6: 6, Nov., 1940.
5. Central Scientific Supply Company, 1400 Irving Park Blvd., Chicago, Ill. (Special Blood collecting vials).
6. Lauer, M. W., 1114 Forest Ave., Wilmette, Ill., Mfg. & Distr. Sulfax No. 5.
7. Becton, Dickinson & Co., Rutherford, N. J. (film). Hyperdermic Syringes, Their Care and Function.

EDITORIAL

THE LABORATORY TELEPHONE

The telephone is often the first and sometimes only contact a patient has with a laboratory or an institution. Within the confines of an institution or hospital there will be many who will form an opinion as to a laboratory's efficiency, courtesy, and professional attitude by the manner in which the telephone is answered. There is not a medical technologist who is unaware of the importance of a proper manner in which to answer a telephone. We are quite aware of the days in which the telephone is a source of irritation and that it is on such days that special care must be taken that the impatience we feel at the interruption does nto creep into one's tone of voice. While at the telephone we cannot estimate the degree of importance the person on the other end of the wire is placing on our tone of voice and the business manner in which we reply. It has been the custom in some laboratories where students are trained, to include a few words of instruction to each new student before he or she is allowed to answer the telephone. One such hospital has as follows:

1. The phone should be answered promptly. Only under rare circumstances should a second ring be required.
2. The person answering shall say, "Laboratory, Miss, Mrs. Mr. ..... speaking."
3. If it is a doctor requesting a report, repeat the name of the patient and the request after the Doctor. This applies also to any message in which a name or order is stated. If the speaker system is used to relay the message, be sure to muffle the telephone receiver during your conversation.
4. If a particular technologist is asked for, inquire if you may take the message. Do not call a department head from his or her work if it is not essential.
5. No laboratory reports are given to anyone but a doctor or an interne.
6. First names are not used in the laboratory, and emphatically never used over a telephone.

7. Personal calls are permitted. This will continue as long as they are not either too frequent or too long in duration. One must remember that the laboratory telephone may be needed by the hospital for a grave emergency at any moment. Two to three minutes should suffice for the longest conversation.

8. A TELEPHONE DOES NOT REQUIRE A LOUDER TONE OF VOICE THAN IS NORMAL. SPEAK LOW AND DISTINCTLY. SLANG EXPRESSIONS ARE UNPROFESSIONAL AND ARE NOT USED OVER THIS TELEPHONE. NO ENGLISH WORDS HAVE BEEN PLACED IN USE BY THE PROFESSION TO SUPPLANT, "Yes, Sir," and "Certainly."

—E. N. J.

ABSTRACTS

●

PRINCIPLES IN THE PROTECTION OF PATIENTS WHO RECEIVE BLOOD: P. Hoxworth, Surgery, vol. 13, No. 2, Feb., '43, p. 324.

The following too frequent sources of error are discussed by the author on the basis of records of 12,000 transfusions performed in 4 years' time in Cincinnati.

1. The use of test serums of high titre. All sera whether prepared in the hospital, or purchased commercially should be standardized by the Coca method of slide titration or by serial titration before use.

2. Failure to observe a well-known principle of agglutination. A death resulted from the use of an "O" donor for an "AB" recipient because the agglutination factor of the donor was of unusually high titre. If group "A" donors are used for "AB" patients in the absence of their own group, only one incompatible factor is present and it may be determined quantitatively.

3. Close observation of the patient during transfusion. Transfusions should be stopped in the event any adverse symptoms develop.

4. Delays in the laboratory due to false agglutination being interpreted as true agglutination. These occur in direct matching and are most common in: (a) occasional effect of sulfonamide blood concentration; (b) sepsis with high sedimentation rates; (c) severe hemorrhage and other extreme anemias; (d) leucemia; (e) cold agglutinations due to the use of icebox samples in the test. This type of false reaction may usually be detected by the open slide technique for matching with stirring to break up the clumps. In true agglutination stirring increases agglutination. Observation of the patient's blood in saline usually shows the same false agglutination effect.

5. Performance of compatibility tests before all transfusions even though the blood is of the same group.

6. The use of Rh negative donors. Routine tests to distinguish Rh negative from Rh positive red cells are not yet practical because of the difficulties of serum supplies but it is possible to obtain small amounts of it and to develop a list of Rh negative donors. Modified direct match tests for anti-Rh factors have been published. These donors should be reserved for use for (a) patients who are or who have recently been pregnant; (b) patients receiving multiple transfusions over a period of days; (c) newborn with erythroblastosis foetalis.

THE EFFECT OF IRON ON THE HEMOGLOBIN REGENERATION IN BLOOD DONORS: A. P. Barer & W. M. Fowler, Am. J. Med. Sci., vol. 205, No. 1, Jan., '43, p. 9.

Under iron therapy 93.5% of the subjects observed had regained their normal hemoglobin level by the end of 8 weeks. Iron therapy hastened hemoglobin regeneration but it did not cause as great an acceleration after subsequent transfusions as when it was administered at the time of the initial transfusion. This indicates it has a stimulating effect as well as providing replacement.

Repeated donations produced no apparent bone marrow exhaustion.

INSULIN REACTION AND THE CEREBRAL DAMAGE THAT MAY OCCUR IN DIABETES: F. D. Murphy & J. Purtell, Am. J. Diges. Dis., vol. 10, No. 3, Mar., '43, p. 103.

A 13 year old child treated with protamine zinc insulin remained in hypoglycemic shock for 4 days even though the blood sugar levels returned to normal 12 hours after admission. The mentality of the child did not return completely, however, as long as a year later. Death followed a subsequent coma.

Similar cases from the literature are reviewed, the dangers of mental changes following insulin shock are emphasized, and the mechanism of insulin action in hypoglycemia is discussed.

GASTRIC ACIDITY IN PULMONARY TUBERCULOSIS: A. L. Krueger, Am. J. Diges. Dis., vol. 10, No. 3, Mar., '43, p. 111.

Study of the gastric acidity of 325 patients in various stages of pulmonary tuberculosis showed an increase in the incidence of gastric anacidity as the degree of the tuberculosis progressed. Anemia did not affect the degree of acidity but significant fever increased the incidence of achlorhydria. Presence or absence of free acid apparently was not a factor in the development of intestinal tuberculosis.

RATE OF PERIPHERAL BLOOD FLOW IN THE PRESENCE OF EDEMA: D. I. Abramson, S. M. Fierst & K. Flachs, Am. Heart Jr., vol. 25, No. 3, Mar., '43, p. 328.

Nineteen patients who had edema in a single upper or lower extremity or in both lower extremities were studied by the venous occlusion plethysmographic method. Peripheral circulation in edematous extremities not associated with organic heart disease was generally increased and definitely not decreased. In chronic congestive heart failure, the readings were within the range for normal subjects.

THE SEROLOGIC REACTION IN CARDIOVASCULAR SYPHILIS: W. Beckh, Am. Heart J., vol. 25, No. 3, Mar., '43, p. 307.

Emphasis is laid upon the fact that many of the figures accumulated to date on Wassermann reports in cardiovascular syphilis are based on the older and relatively less sensitive Wassermann techniques. This study is based on 100 cases diagnosed at autopsy in which the serological tests had been performed by a modern technique.

Of 49 cases of aortic insufficiency or aneurysm or both, 88% showed a positive Wassermann or Kahn on the first examination. Of 51 cases of uncomplicated aortitis, 86% had a positive serological reaction. None of these had been diagnosed clinically. Of the 49 cases in which cardiovascular syphilis was diagnosed clinically, 96% either had positive serological findings or gave a history of treatment.

THE EFFECT OF STORAGE AT VARIOUS TEMPERATURES ON THE PROTHROMBIN CLOTTING TIME OF HUMAN PLASMA: R. C. Page & E. J. de Beer, Am. J. Med. Sci., vol. 205, No. 2, Feb., '43, p. 257.

Samples from 15 patients were stored at 38°C., room temperature (23°C.) and in the refrigerator (5°C.) for intervals of 1-4 hours. Even at refrigerator storage, one blood showed an increase of 7 seconds in prothrombin time during the first storage hour. In general the prothrombin time increased proportionately with the time of storage. The rate of increase was also directly proportionate to the storage temperature. These observations indicate that prothrombin clotting times should be completed as soon as possible after the blood is obtained.

A SIMPLE SPUTUM CONCENTRATION METHOD FOR DEMONSTRATION OF TUBERCLE BACILLI: E. Nassau, Tubercle, vol. 23, No. 8, Aug., '42, p. 179.

The method of Jungmann, based on liquefaction rather than homogenization is presented. The technique is as follows:

Solution "A"		Solution "B"
Ferrous sulfate	20 g.	Hydrogen peroxide
Conc. sulfuric acid	20 cc.	1 vol. per cent.
Distilled water	180 cc.	

Solution "A" keeps indefinitely. Solution "B" is to be made fresh on each occasion. Place in a sterile centrifuge tube 5 cc. sputum, 3 cc. of solution "A" and 3 cc. of solution "B". Let stand 5-10 minutes or until solution of the mucin is complete. Centrifuge. Wash the deposit with 5% sodium citrate or 2% sodium lactate, to neutralize it and to remove any surplus peroxide. The deposit may be stained by direct smear or, if sterile tubes and solutions have been used, it may be cultured or used for animal inoculation.

Jungmann and Gruschka found 2-10 times more tubercle bacilli per field by this method than by direct smears. Standing for 1 hr. with the reagents did not seem to inhibit the growth but standing 3 hrs. reduced the number of viable organisms. The authors recommend: 1. concentration, 2. bacterioscopy and 3. culture of the samples giving negative smears.

THE DETERMINATION OF THE TRUE CELL VOLUME BY DYE DILUTION, BY PROTEIN DILUTION AND WITH RADIOACTIVE IRON. THE ERROR OF THE CENTRIFUGE HEMATOCRIT: M. A. Chapin & J. F. Ross, Am. J. Physiol., vol. 137, No. 2, Sept., '42, p. 447.

In routine observations in which only comparative hematocrit values are necessary, the centrifuge method is sufficiently satisfactory if always performed under the same physical conditions.

Methods are described for determining the true cell volume by means of the protein dilution method, the Evans blue method and by the injection and quantitative recovery of radioactive iron. These methods give a value consistently 8.5% lower than the hematocrit values on the same blood. The use of this correction factor is not advised, however, because the packing of cells in centrifuging may be influenced unduly by excessive variations in cell size, and specific gravity or viscosity of the plasma.

HOT SOLUTIONS OF THE SULFONAMIDES: F. R. Adams, J. Am. Den. Assoc., vol. 30, No. 1, Jan., '43, p. 58.

A 6% solution of sulfonamide in distilled water was used at 140° F. for the disinfection of pulp canals and periapical lesions. In vitro studies indicated that the action was bacteriostatic with a longer contact with the drug necessary to cause death of the organism. Sulfanilamide was found most effective for the treatment of apical infection. Two negative cultures were obtained in a large proportion of cases after only two treatments.

THE EFFECT OF ATROPINE ON GASTRIC SECRETION DURING THE NIGHT: F. B. Mears, Surgery, vol. 13, No. 2, Feb., '43, p. 214.

Fifty normal and 15 ulcer patients were studied. Observations the first night served as controls. The second night atropine was given by proctoclysis. In the control observations, values were found tory rate, volume of secretion and free and total acidity were found higher in the ulcer group than in the normal. Atropine lowered all these values for both groups but the decrease was much greater in the ulcer group.

THROMBOCYTOPENIC PURPURA CAUSED BY SULFONAMIDE DRUGS. A REPORT OF 3 CASES: L. W. Gorham, S. Propp, J. L. Schwind & D. R. Climenko, Am. J. Med. Sci., vol. 205, No. 2, Feb., '43, p. 246.

Three new cases of secondary thrombocytopenic purpura following administration of sulfonamides are reported and the 5 previously published are reviewed. Of these, 4 (50%) died. Fatal purpura has been caused by sulfanilamide, sulfapyridine and sulfadiazine, with death occurring from as little as 7 gm. The one case reported from sulfathiazole recovered.

In examining blood smears for agranulocytopenia in patients receiving sulfonamides the platelets should also be evaluated. Decrease or disappearance may be evident before clinical signs of purpura and by stopping the sulfonamide administration early, death may be avoided.

THE PREDICTABILITY OF THE CHARACTER (INCREASED OR NORMAL) OF THE ERYTHROCYTE SEDIMENTATION RATE. A SURVEY OF 1000 CASES: J. D. Helm, Jr., Am. J. Med. Sci., vol. 205, No. 5, Feb., '43, p. 241.

Of the 1000 case histories reviewed, the sedimentation rate had been of value in the diagnosis or management of 237 and of no value in 763. Serial determinations of the sedimentation rate are of value in following the course of rheumatic fever, tuberculosis, coronary occlusion and arthritis. Single tests are of value only when, in the absence of indications of organic lesions, a functional disease seems likely. Here an increased sedimentation rate indicates the need for further investigation.

THE ABSORPTION RATE FROM THE BONE MARROW: L. M. Meyer & M. Perlmutter, Am. J. Med. Sci., vol. 205, No. 2, Feb., '43, p. 187.

Circulation times were determined by means of measuring in seconds the time required for saccharin injected into the median basilic vein or into the sternum to be tasted in the mouth. Of the 24 patients used, the two routes were essentially the same in 21. Two cases of cardiac decompensation showed a shorter circulation

time from the sternal marrow to tongue than for the venous method and in 1 case the two routes were identical.

Injection of fluids into bone marrow is advocated in instances in which the venous method cannot be employed, such as severe burns, shock with peripheral vascular collapse, etc.

ABSORPTION AND EXCRETION OF SULFONAMIDE COMPOUNDS SUSPENDED IN OIL. OBSERVATIONS ON ANIMALS AND ON PATIENTS WITH CHRONIC OSTEOMYELITIS: D. M. Angevine, War Med., vol. 3, No. 2, Feb., '43, p. 186.

Suspensions of sulfanilamide and sulfathiazole in soybean oil when injected subcutaneously in experimental animals produced only slight local reactions. These suspensions were instilled into the infected sinal tracts of 5 patients with osteomyelitis. The drugs could be found in the blood during 6 days and excretion continued for as long as 137 days. Two of the five showed complete healing of the sinuses and the others were improving at the time of writing. As all these patients had been previously treated with these drugs with less success, it seemed this method of treatment was more effective.

SERIAL BONE MARROW STUDIES IN PERNICIOUS ANEMIA.

1. **Fluctuation in number and volume of nucleated cells.**
2. **Nucleated cells and blood and urine uric acid.**
3. **Occurrence of protoporphyrin in human bone marrow.**

J. Stasney, P. Pizzolato & W. McCord, Proc. Soc. Exp. Biol. and Med., vol. 51, No. 3, Dec., '42, p. 335.

Sixteen patients with Addisonian pernicious anemia were studied before and after remission induced by liver. A marked decrease of nulceated cells was observed 6-24 hours after the first liver injection. Following this there were periodic increases and decreases in the normoblasts with almost complete depletion at times.

An increase of uric acid in the blood and urine occurred simultaneously with the diminution of normoblasts in the bone marrow and with the increase of reticulocytes in the peripheral blood.

Protoporphyrin occurred most regularly in marrow samples containing predominantly young red cells and corresponded with the increase of immature red cells of normoblastic type in the marrow,

BOOK REVIEWS

CLINICAL SIGNIFICANCE OF THE BLOOD IN TUBERCULOSIS: By Gulli Lindh Muller, M.D., Pathologist and Director of Laboratory, New England Hospital for Women and Children, Boston; formerly Pathologist, Rutland State Sanatorium, Rutland, Massachusetts. The Commonwealth Fund, New York, 1943, p. 516. Price $3.50.

There must be pride of accomplishment in release of a monograph that covers a subject of such continuous interest as the behaviour of the blood in tuberculosis. Dr. Muller's work exemplifies a wish fulfillment probably of every hematologist—that of correlating exhaustively all the vagaries of the blood pattern with at least one major disease entity.

There is a profusion of observation on and discussion of hematologic findings in tuberculosis to be found in contemporary periodicals and text books but within this volume are incorporated the most salient contribution with an impartial analysis of their dependability. When such a broad survey is supplemented with extensive technical data derived from well conceived and controlled studies the final result could be nothing short of conclusive and authoritative.

This reviewer's interest in hematology prompts him to remark that each chapter of the book is significant, hence mentioning the discussion of the nuclear shift, the lymphocyte-monocyte ratio and the erythrocytic changes does not in any sense imply that they highlight the monograph. These special sections are intensely interesting, however, and accentuate their importance in the study of such a variable disease entity as tuberculosis. It was particularly enlightening to find that the association of Addisonian pernicious anemia and tuberculosis is rather rare since the reviewer has seen fine instances in a series of 400 pernicious anemia patients.

In summary, there is a wealth of hematology and tuberculosis covered in this fine monograph which defines for the hemopathologist as well as the clinician the subject as titled. There are numerous tables, charts, graphs, an excellent bibliography and an adequate index.

BLOOD GROUPS AND TRANSFUSION: By Alexander S. Wiener, A.B., M.D., Serologist and Bacteriologist in the Office of the Chief Medical Examiner of New York City. Head of Transfusion Division, Jewish Hospital of Brooklyn, New York. Charles C. Thomas, Springfield, Illinois, 1943. P. 438. Price $7.50. Third Edition.

This new edition of a comprehensive treatise on the technic of blood grouping and practical hemotherapy presents additional chapters, revision of numerous others and has been entirely reset from new type.

Extremely important and scientifically interesting are the data on the role of irregular isoagglutinins in transfusion reactions, intragroup isoimmunization against factors Rh, A1, M, and P, use of Rh negative donors, causes of hemolytic transfusion reactions with particular attention to the Rh factor, discussion of autoagglutinins, reactions to stored blood, plasma, serum and whole blood, as well as innumerable well expounded rules and postulates governing the technic for matching and performing the various procedures involved in the therapeutic use of blood and its derivatives.

Along with this fund of technical material are historical sketches pertinent to the subject material, new data on the racial distribution of blood groups together with their geographic distribution, medicolegal information relating to several blood tests all of which amplify the major objective of the author—to advance and expand the body of knowledge concerning each and every phase of hemotherapy.

There are 69 figures, 106 tables, an extensive bibliography of 1054 references and an adequate index. This volume is not just a compilation of useful data but is a well arranged and carefully prepared presentation of intricate subject matter for which both author and publisher merit commendation.

NEWS AND ANNOUNCEMENTS

NOTICE

A Message to Members of the American Society of Medical Technologists

WE ARE AT WAR. Our country, our way of life, our method of livelihood is threatened. It is unwise for us to congregate in large numbers; it is unwise for us to complicate the nation's travel and communication lines; it is unwise for us to spend money for any purpose that may be considered unessential.

These truths have brought forth the unanimous decision that in 1943 the American Society of Medical Technologists shall not hold a convention.

WE ARE AT WAR. Our country, our way of life, our method of livelihood is threatened. It is unwise for us to relinquish one iota of the ground we have gained in our struggle to unite the registered technician into a fellowship; it is unwise for us to cut, at a critical hour, the routes of travel we have blazed through ten years of learning to cooperate with ourselves and the proper medical channels; it is unwise for us to relax our vigilance over a single penny that that may be used to save this organization to resume its progress in a post war peace.

These truths have brought forth the decision that in 1943 the officers and board of directors of the American Society of Medical Technologists shall meet and conduct such business as is legal and right under the circumstances.

It has been voted that this meeting be held in the Hotel Drake, Chicago, Illinois, June 4-6, at the time of the meeting of the American Society of Clinical Pathologists. This plan is tentative as all plans must be in such times as we are facing.

It is with the deepest regret that these changes have been made and I wish to take this opportunity to assure you that the officers and directors will act in such a manner as to preserve the Constitution and the rights and powers of the House of Delegates.

TO OFFICERS, DIRECTORS, ADVISORS, COUNSELLORS, AND ALL MEMBERS OF AFFILIATED GROUPS

Circumstances over which we have no control has placed upon the President, Officers and Directors a burden of administration far beyond any foreseen at the time of elections. It is a state of affairs, which, unless we work with perfect frankness, honesty, and with farsighted judiciousness, may result in disaster. It is with heartfelt thankfulness that I am able to tell you that the degree of cooperation among the present officers is such that the members may rest assured that we are united with the one desire to carry out the wishes of the majority of members and to do the best for the future of the organization.

This Journal is the voice of the society and in this Journal all members shall find a correct presentation of the problems, and the manner and reason of their solving as the officers find and discuss them at their meeting. In this manner it is my hope that we may all remain in close contact with the progress, financial status, and management of our society.

That we may all comprehend the immediate problem of government that shall be a concern of the meeting in Chicago let us review together certain parts of our Constitution and By-laws.

Article X, Section 1. "The House of Delegates shall be the governing body of this society, but when the House of Delegates is not in session all corporate powers except those expressly reserved to the House of Delegates by these articles or the by-laws may be exercised by the Board of Directors."

By-laws, Article III, Section 5. "At each annual meeting, the House of Delegates shall nominate and elect a nominating committee of not less than three nor more than five active members of the society, who shall at the following annual meeting report their recommendations for persons to fill the offices and board memberships to be elected by the House of Delegates. In the event of vacancies in said committee occurring between annual meetings the president may make an appointment to fill said vacancies or may allow said vacancies to remain unfilled if doing so shall not reduce the membership of the nominating committee below three. The nominating committee shall not recommend any of its own mem-

bers for office and shall not present any nominee for office who has not consented to serve in such office if elected."

Article IX, Section 11. "Vacancies occurring in offices filled by election by the House of Delegates and in the membership of the board of directors and advisory board shall, unless otherwise provided above, be filled to the close of the then current fiscal year by election by the board of directors and any portion of the vacant term remaining after the end of the fiscal year shall be filled by an election by the House of Delegates at its next annual meeting. No officer except treasurer and executive secretary and no member of either such board shall be eligible to any such office or membership for more than two terms in succession. Vacancies in any office elected by the board of directors shall be filled for the unexpired term by election by the board of directors. No officer shall hold more than one office during any one term, except as may be provided in the by-laws."

Twenty-one letters were sent to representative members for an opinion regarding the status of officers for the coming year. Less than half of the letters have been answered up to the present time, but, with one exception, the feeling has been that the officers remain status quo. This would mean that, according to Article IX, Section 11, the president could remain for one term more and then the president-elect, placed in office by the House of Delegates, could assume office for two terms. This would give us two years with the third necessitating a meeting of the House of Delegates.

By-laws Article IV, Section 2: "When the House of Delegates is not in session, the board of directors shall have, subject to the limitation and duties imposed by the articles of incorporation and these by-laws, general management of the affairs of the society."

Article IV, Section 3: "No moneys of the society shall be expended without the approval of the House of Delegates or of the board of directors and whenever circumstances permit no obligation shall be incurred without such approval obtained in advance, except that wherever the articles of incorporation or by-laws expressly authorize payment by the society, reasonable indebtedness may be incurred for the objects so expressly authorized without obtaining authority in advance."

The Constitution seemingly grants a measure of power to the Officers and Directors that enables them to carry on the routine business. One of the routine measures that have always been strictly adhered to in our annual meeting has been the report of the auditors of the books of the Treasurer and the Executive Secretary. That funds be properly handled to the members' satisfaction, and that the Treasurer and Executive Secretary feel secure from an adverse criticism, I have requested, at their suggestion, that the books be audited as usual and the report made ready to present at the officers' meeting.

In the previously mentioned letters, suggestions were requested regarding the papers by technicians. It is a general opinion that the papers should be presented to the society by the Chairman of the program committee at the Chicago meeting where judges may be picked from attending pathologists and the awards announced through the Journal and then mailed to the recipients. *Loretta Laughlin, Marion General Hospital, Marion, Indiana, is the chairman of this committee and papers should be sent to her at the earliest possible time.*

These are busy times for you and I have taken up a good deal of it in presenting a situation in detail and without many definite conclusions. I have a reason for doing this in such a manner. This is your society. These are your problems. These are some of the points that you may have definite opinions about, and, if that is true, it is essential that you write them to me as a guide. I want every officer, state society, and member to know that I welcome all letters stating opinions and problems and promise to place each opinion and problem before the officers in an earnest attempt to sincerely represent those who have placed me in office.

I know I speak for my colleagues when I say that the one great purpose with which we meet without a full convention is to sincerely carry on what business is absolutely essential to our existence without imperilling in any way the established mode of government and the future usefulness of the American Society of Medical Technologists.

EVELYN N. JARDINE,
President American Society of Medical Technologists.

JOURNALS WANTED

Any person having the following back numbers of the American Journal of Medical Technology or the Bulletin of the A.S.C.L.T., kindly contact Editorial Office, 4310 W. Fort St., Detroit, Mich.:

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January, 1935
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The launching of another major attack on the problems concerning the spread of infantile paralysis was made known today when Basil O'Connor, president of The National Foundation for Infantile Paralysis, announced that the National Foundation had made a five-year grant, totaling $150,000, to the Yale University School of Medicine, New Haven, Connecticut, for the establishment of the Yale Poliomyelitis Study Unit. The term of the grant will conclude June 30, 1948.

The funds which make this and other research projects of the National Foundation possible are contributed each year during the celebration of the President's birthday in January.

In 1931 the Yale Poliomyelitis Commission was established by Doctors James D. Trask (now deceased) and John R. Paul, as a result of emergency problems which grew out of the serious epidemic of infantile paralysis which swept New England that year. Since its inception the Commission's aim has been to develop a virus laboratory particularly adapted for use by clinical members investigating the methods by which the disease is spread and transmitted.

In announcing the grant Mr. O'Connor said: "It now seems advisable to place the Commission's work on poliomyelitis on a more permanent basis than has heretofore existed. In view of the present war some doubt might exist as to whether such research can be maintained. Such doubt is resolvable by the grim fact that wartime frequently amplifies the opportunity for such study. Research into the spread of poliomyelitis should continue now more than ever because so many new lines of investigation have opened up and the wartime drain on medical services has left fewer properly trained people to pursue the study of how the disease of poliomyelitis is transmitted.

"The Yale University School of Medicine will reorganize its investigation of poliomyelitis problems and henceforth studies will be conducted in the Poliomyelitis Study Unit in the Section of Preventive Medicine, under the direction of Dr. John R. Paul, professor of Preventive Medicine. Dr. Paul will have full authority and responsibility for determining the nature of such laboratory and field studies as may be conducted."

Dr. Paul, who has made many notable contributions to scientific knowledge in the field of the epidemiology of poliomyelitis, will have full administrative direction of the Study Unit. But a special Advisory Committee of the National Foundation for Infantile Paralysis will be appointed by Mr. O'Connor to consult with Dr. Paul and his associates as the need arises. Insofar as the Study Unit facilitates permit, the National Foundation may send the Unit individuals properly qualified in the opinion of the Foundation's Medical Advisory Committee, to pursue definite lines of investigation. And if, in time of epidemic, the National Foundation should require the assistance of the Study Unit its facilities will be made available.

To meet the immediate needs of the Study Unit space will be arranged by the Yale University School of Medicine. None of the funds granted by The National Foundation for Infantile Paralysis will be used for the construction of new buildings.

WAR CONFERENCE

The medical, surgical and industrial hygiene experts who are so ably safeguarding the well-being of more than 20 million industrial workers have agreed to pool their knowledge and exchange their experiences regarding the many new and complex problems of today's wartime production. For this purpose their organizations—

The American Association of Industrial Physicians and Surgeons,

The American Industrial Hygiene Association, and

The National Conference of Governmental Hygienists—are combining their annual meetings in a four-day "War Conference" at Rochester, New York, May 24-27, 1943. Among the problems to be discussed from a practical standpoint are:

The mass entry of women into industry;

Older-age employees, with their various associated problems; proper placement and employability considerations of the 4F rejectees;

Rehabilitation and proper employment of those already discharged from the military services because of disabling conditions;

Toxic and other hazards from new substances, new processes, and the use of substitute materials;

Absenteeism; fatigue; nutrition;

Effects of long hours; double shifts; two-job workers; overtime; increased industrial accident rates;

Advances in the treatment of illnesses and injuries, and many others.

This joint meeting will be a report on the state of the nation, by the men who know, in matters of industrial health. Dr. William A. Sawyer, Medical Director of Eastman Kodak, is General Chairman; Dr. James H. Sterner and Lieut. Comm. J. J. Bloomfield are arranging the programs for the industrial hygienists.

Physicians and surgeons, hygienists, engineers, nurses, execu-

tives—all who are interested in the problems of industrial health and their solution—are invited to attend as many of the sessions as they can arrange for; no registration fee is required.

Nebraska

Program for the Nebraska Society of Medical Technologists. Annual meeting, April 2 and 3, 1943. Lincoln General Hospital in Lincoln, Nebraska.

FRIDAY, APRIL 2, 1943

3:00 p.m. Registration.

3:30 p. m. Business (Roll call; minutes; present amendments; present names of new members; report of nominating committee).

4:00 p. m. "The Development of Bacteriology," Dr. L. Van Es, Chairman of the Department of Animal Pathology and Hygiene, Agricultural College, University of Nebraska.

4:45 p. m. "Prerequisite Courses for Medical Technologists," Dr. George L. Peltier, Chairman of the Department of Bacteriology, University of Nebraska.

5:30 p. m. Demonstration of preparation of blood plasma—Abbott Company.

6:15 p. m. Dinner, Lincoln General Hospital.

7:30 p. m. "Virus Diseases," Major Ferdinand C. Helwig, M.C., Chief of the Laboratory Service Army Air Base, Lincoln, Nebraska.

SATURDAY, APRIL 3, 1943

9:00 a. m. "Demonstration of Acid and Alkaline Phosphotase," Marjorie Lundeen, M.T., Virginia Schamp, M.T., Technicians at Lincoln General Hospital.

9:20 a. m. "Series of Blood Counts During Insulin Shock Therapy," Rachael C. Hall, M.T., Norfolk State Hospital, Norfolk, Nebraska.

9:40 a. m. "The Webster Test," Ruth Frey, Mead Ordnance Plant, Mead, Nebraska.

10:00 a. m. "Bacteriology of War Wounds," Dr. Paul Bancroft, Lincoln, Nebraska.

11:00 a. m. "Demonstration of M. Tuberculosis by Fluorescent Microscopy," Dr. F. H. Tanner, Pathologist at Lincoln General Hospital, Bryan Memorial Hospital, and Lincoln Orthopedic Hospital.

12:15 p. m. Luncheon, Lincoln General Hospital.

1:30 p. m. Business Session (Committee reports; Officer reports; election of officers).

2:30 p. m. "Amoebiasis," Dr. M. F. Gunderson, Professor of Bacteriology, Medical College, University of Nebraska, Omaha, Nebraska.

4:00 p. m. Tea, installation of officers, Nurses' Home, Lincoln General Hospital.

New members approved April 3, 1943 (Active):

Armstrong, Ruth, 409 East Washington Ave., Council Bluffs, Iowa.

Barnes, Elsa, 223 East 6th St., Hastings, Nebraska.

Lundeen, Marjorie, 2248 Sewell, Lincoln, Nebraska.

Otis, Grace, St. Elizabeth's Hospital, Lincoln, Nebraska.

Schamp, Virginia, 937 Rose Street, Lincoln, Nebraska.

Welty, Elizabeth, 4419 Spaulding, Omaha, Nebraska.

(Associate): Williams, Mildred, 5302 Greenwood St., Lincoln, Nebraska.

Officers elected April 2, 1943:

President: Wilma Eicher, 345 N. 37th St., Omaha, Nebraska.

President-Elect: Ramona Forbes, 2411 S. 23rd St., Lincoln, Nebraska.

Vice-President and Program Chairman: Florence Tucker, 2751 Everett, Lincoln, Nebraska.

Secretary: Mary H. McMillan, 4237 Farnam St., Omaha, Nebraska.

Treasurer: Harriet Paige, 4601 Florence Blvd., Omaha, Nebraska.

Sixth Council Member and Membership Chairman: Gertrude Ebers Hughes, 721 West 14th St., Grand Island, Neb

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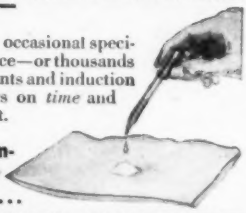

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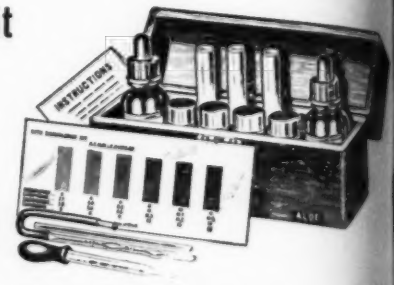

Reference

A. Goth, "A Simple Clinical Method for Determining Sulfonamides in Blood," *Journal of Laboratory and Clinical Medicine*, Vol. 27, No. 6, March 1942.

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